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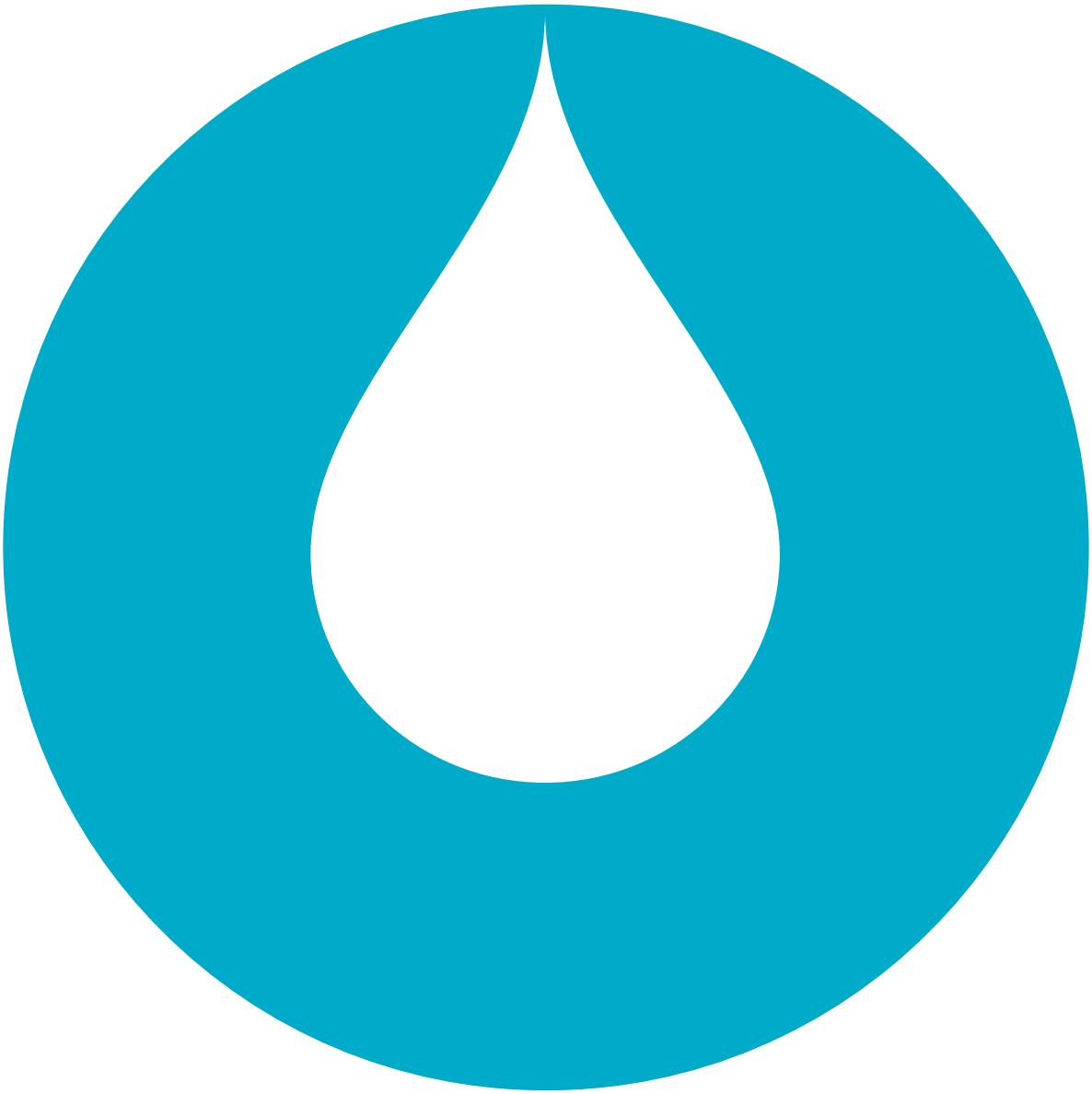
TOTAL CONCRETE PROTECTION



EVERCRETE VETROFLUID

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Ecobeton deals with protection and durability. In particular it develops, produces and sells products and systems for the total protection of concrete artefacts and building material. By using selected raw materials, it offers solutions which are both effective and respect human beings and the environment, materials that have been tested since 1918 with documented reference worldwide. Operating in direct partnership with Ecobeton International AS, the historic Norwegian head office and parent company, in the last decade several Ecobeton branches have been established in several European countries: Sweden, Austria, Germany, France, Spain, Portugal, Denmark, the Czech republic, Hungary, Croatia and Slovenia.
Since its establishment Ecobeton has been sustained corporate responsibility offering non-toxic products, fully eco-compatible and easy to apply. Our production is specialized in three lines:
- Protection
- Coatings
- Refurbishment

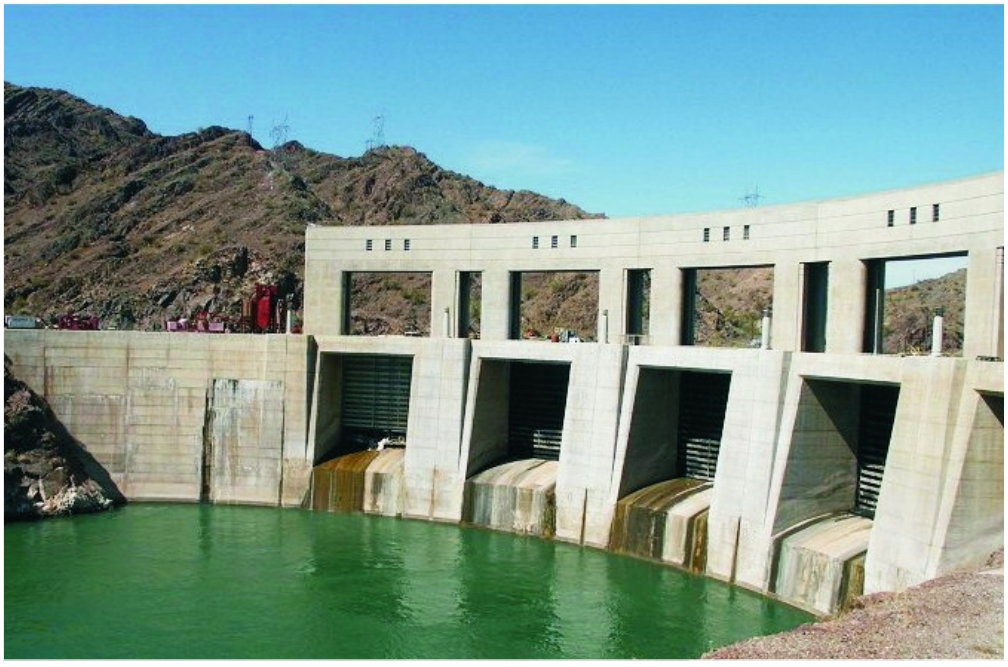
The **PROTECTION** line includes systems aimed at increasing the durability of the materials employed in building such as concrete, wood and stone, environmentally friendly products for waterproofing and cement coatings for refurbishing deterioration.
The line includes:
- Brickcover: water-repellent for protecting stone and bricks;
- Everwood: wood protective product;
- Evercrete Vetrofluid: water-repellent for concrete;
- Evercrete Pavishield: anti-dust protective product for industrial floors;
- Ercole: cement base coating for low thickness casts;
- Structural Bond-Kote: cement base mortar for high thickness casts.

Introduction to Evercrete Vetrofluid

Contemporary waterproofing systems are varied, different in terms of technical performance, application methods and physical characteristics.
Liquid sheaths, bituminous conglomerates, waterproofing membranes, impregnating and osmotic agents, are only a few types of waterproofing systems present in the building sector.
The choice is wide and varied, but it is not about choosing a system or a product in the hope that it is the appropriate treatment for that particular application; it is about choosing a waterproofing system that ensures functionality and effectiveness in time.
Water is the agent that undermines buildings the most.
The combined action of water and time corrodes rock, cement, concrete and even steel. It is able to irreversibly compromise waterproofing systems: it erodes, digs and creeps into the thinnest cracks of artefacts and buildings, causing extensive damage, as in the case of moisture sweating and infiltrations.

Deterioration is an almost inevitable phenomenon: not only the action of atmospheric agents but also time and wear can compromise the artefact itself.
Besides designing the artefact or building, it is also necessary to study an appropriate waterproofing system, that will not fail, ensuring the durability of artefact.
That is why it is necessary to protect the building materials.
Some of the technologies used until now, had a discrete duration in time as regards waterproofing, but were not able to contrast deterioration phenomena.
From 1918 onwards an innovative technology has been perfected which allows both to waterproof structures and to contrast deterioration phenomena.
Evercrete Vetrofluid®, developed thanks to Ecobeton's experience and to studies carried out in the United States, is the only product able to combine protection and waterproofing. **Evercrete Vetrofluid®** waterproofs and consolidates permanently and definitively, making the support durable in time.

Parker Dam (River Colorado , United States, 1937) waterproofed with Evercrete Vetrofluid



Waterproofing treatment

Glass is a recyclable, but not biodegradable, material that begins to decay after 400 years.
From the early twentieth century to the present day a series of studies have been carried out that have led to the creation of a product capable of vitrifying in concrete, endowing it with the same waterproofing properties of glass.
Based on waterglass in aqueous solution and on selected silicates, **Evercrete Vetrofluid®** is a special waterproofing and anti-deterioration product for concrete, its specific catalyst allows the product to penetrate up to 40 mm in concrete and to become a waterproofing barrier, permanent and definitive in time.
Evercrete Vetrofluid® is colourless and does not leave films or foils of any kind on the surface of the support. Consequently the concrete maintains its natural aspect.
It replaces all other technologies (bituminous membranes, water-repellent products, impregnating agents) and it is used on all and concrete artefacts and installations, both vertically and horizontally).
It is also effective in negative pressure (up to 10 atm), for waterproofing in a second moment and only from within or for waterproofing when building a retaining wall or a structure in contact with soil.

What is waterglass?

Waterglass is a chemical substance that has been known for centuries and since 1825, thanks to Johan Nepomuk von Fuchs, the industrial production of water-soluble sodium silicates has been analysed becoming known as “liquid glass”(waterglass).
Waterglass, or liquid glass, or soluble glass is nothing else but sodium silicate (xSiO2 *Na2O), where the ratio between sodium and silicate (x) can vary between 0.50 and 3.75 on a molar basis. Soluble glass used for applications on concrete has a x=3.25.
The reaction that unleashes by impregnating the porous concrete with liquid glass leads to the formation of a calcium silicate and lye based gel. $Ca(OH)2 + Na2O * xSi = O2 + 2NaOH$.
This reaction occurs thanks to the presence of free calcium hydroxide present in the composition of the concrete reducing the average pore section, sealing and protecting them from water and deterioration phenomena.
Evercrete Vetrofluid®, in the same way as waterglass, reacts with the cement material triggering the vitrification reaction: the pores and micropores in the concrete are sealed and the concrete is waterproofed, while maintaining its breathability.

Evercrete Vetrofluid®: characteristics

- It is a permanent and definitive treatment
- It penetrates up to 40 mm into the concrete
- It creates a permanent and definitive waterproof barrier also in negative pressure (up to 10 atm)
- It seals the internal porosity of the concrete
- It consolidates the concrete
- Applied on foundations and bed castings it blocks rising damp.
- Resistant to chemical aggression
- It is environmentally friendly and non-toxic, safe for human beings and for the environment
- It has an excellent resistance to cycles of freezing and thawing and to de-icing salt aggression
- It bears the CE marked in conformity with UNI EN 1504-2 (certificate number GB08/76012 issued by SGS United Kingdom Ltd)

CE
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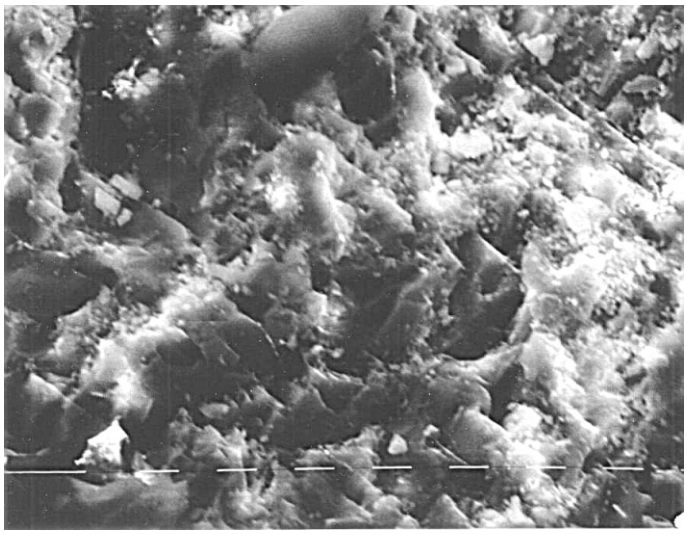
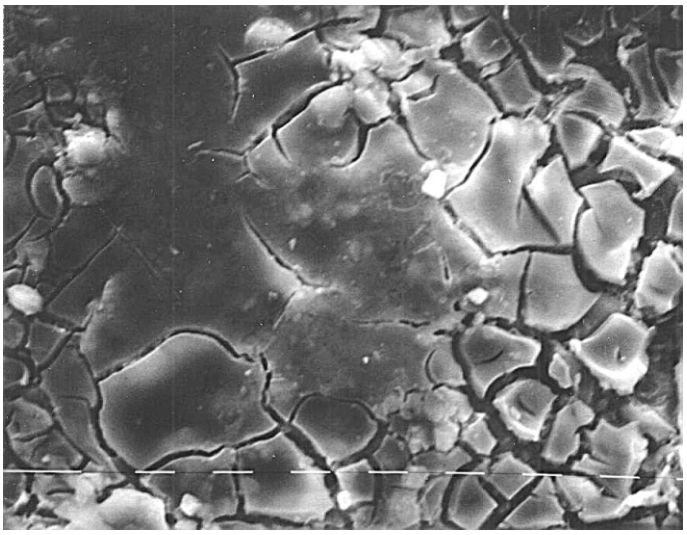


Untreated cement material



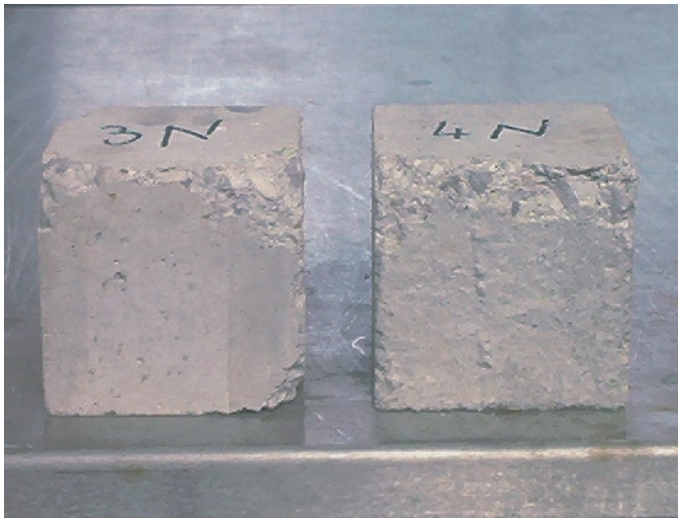
Cement material treated with Evercrete Vetrofluid

Consolidating treatment

A good waterproofing system cannot overlook the conditions of concrete.
Natural deterioration phenomena combined with a badly made concrete, human errors in the design and use of concrete can compromise the effectiveness of waterproofing. That is why it is necessary to protect and consolidate it.
Concrete is a material with a continuous porosity, the lack of protection may cause crumbling, fissuring, detachments, expulsion of the concrete cover, carbonation, corrosion of rebars and make it subject to accelerated deterioration in time.
The costs in terms of time and money for the refurbishment of deteriorated concrete are expensive.
The innovation of **Evercrete Vetrofluid®** lies in its double waterproofing and consolidating function. By penetrating up to 40 mm in depth, it seals the pores permanently and definitively, creating a resistant, consolidated, waterproof barrier against water and moisture.
Concrete remains intact, healthy, consolidated and breathable thanks to the action of **Evercrete Vetrofluid®**.

Evercrete Vetrofluid®:
- increases the concrete's a cortical compressive strength by 30%;
- has a resistance in the negative pressure of 1 MPa - ca 10 atm;
- resists without being damaged to 300 freeze-thaw cycles;
- reduces 70% of the absorption of water under pressure.

Concrete wall. As it sets concrete diminishes its volume by 1%



Untreated concrete subject to 300 freeze-thaw cycles

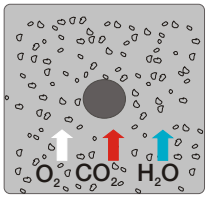
Concrete treated with Evercrete Vetrofluid and subject to 300 freeze-thaw cycles

Treatment against carbonation

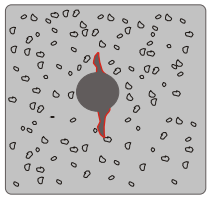
The most common aggressive agent is carbon dioxide which is the main cause of the phenomenon known as carbonation.
Carbonation is a chemical phenomenon, caused by the carbon dioxide present in the air, that negatively affects the concrete rebars causing them to oxidise.
Concrete forms a protective environment for the rebars as the calcium hydroxide it contains is highly alkaline; this allows the development of rebar passivation conditions.
But carbon dioxide chemically combines with the lime present in the concrete turning it into calcium carbonate (lime scale) and water vapour. This causes a drastic fall of the pH so, when the value goes below 11, the environment becomes hostile for the rebars that depassivate, i.e. become vulnerable to the aggression of oxygen and water and start rusting, giving way to the expansive reaction typical of rust.
This phenomenon causes the reduction of the original diameter of the rebar and tension within the concrete cover, causing fissures and detachments.
The damage is not only aesthetic but above all structural: the rebars, as well losing their original diameter, are fully exposed to external agents (e.g.: chlorides, among the most frequent and dangerous), with consequent costs for repairing the deteriorated concrete.

Evercrete Vetrofluid® is able to prevent the carbonation phenomena and the detachment of the concrete cover maintaining the concrete intact and preserved.
In fact, the treatment blocks the passage of moisture and carbon dioxide avoiding the triggering of carbonation reaction.

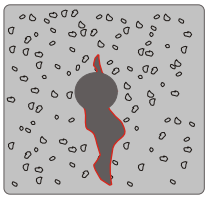
Exposed rebars due to carbonation effects



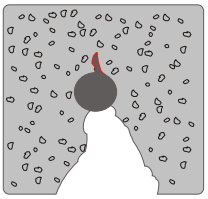
Untreated concrete is attacked by elements such as water, oxygen and carbon dioxide, that trigger the carbonation process.



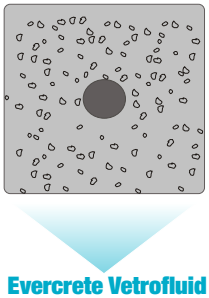
The rebar oxidises starting to cause fissures.



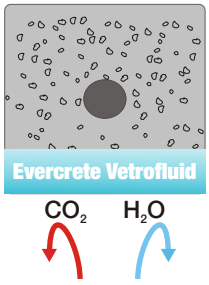
The fissures increase in volume due to the expansive reaction of iron oxide, involving the entire concrete cover.



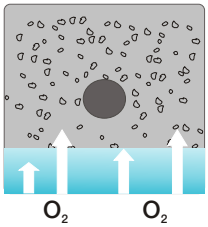
Due to the internal tensions caused by the oxide expansion, the concrete cover is expelled.



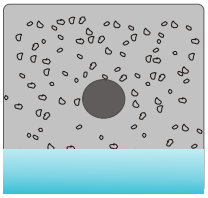
Spray application of Evercrete Vetrofluid.



Evercrete Vetrofluid crates a barrier that repels water and carbon dioxide.



Evercrete Vetrofluid lets the concrete breathe allowing the passage of oxygen.

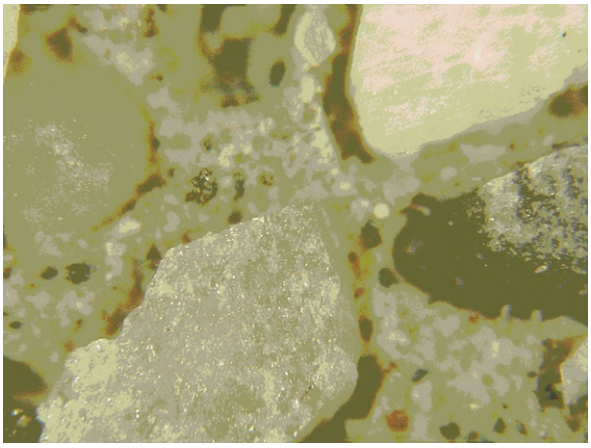


Evercrete Vetrofluid maintains the concrete consolidated and intact.

Anti-acid treatments

Many industrial, chemical and agricultural activities produce and make use of organic and inorganic acid substances. The day-to-day use and accidental spillages of these substances can compromise the aspect of the concrete and lead to structural deterioration phenomena even a short while after commissioning the artefact.
Chemical industries, biogas plants, waste containment tanks, wastewater tanks, pits and livestock farms can finally be protected against the corrosive action of acids thanks to **Evercrete Vetrofluid®**.

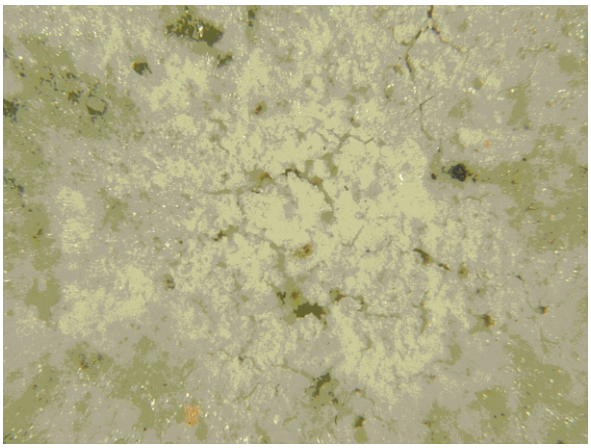
Evercrete Vetrofluid® is a permanent and definitive anti-acid treatment: it penetrates into the pores of the concrete, it enhances it by making it more resistant to the corrosive effect of acid substances and it ensures its durability in time.



80x enlargement. Untreated sample subject to aggression by concentrated hydrochloric acid (36-38%)

Evercrete Vetrofluid® resists:

- to sulphuric, nitric, hydrochloric acids;
- to acetic acid;
- to salts;
- to chlorides and sulphates;
- to other acids of organic origin.



80x enlargement. Sample treated with Evercrete Vetrofluid and then subject to aggression by concentrated hydrochloric acid. On the whole the sample has maintained its integrity

Evercrete Vetrofluid® is used:

- in cellars in contact with liquids produced by fermented grapes;
- in barns and stables in contact with chemical and natural substances;
- on concrete of biogas tanks;
- on concrete of horizontal silos and of trenches in contact with biomasses;
- in industries that make use of corrosive substances;
- on concrete in contact with de-icing salts;
- in refuse storage centres;
- on roads, bridges, tunnels, underpasses;
- on wastewater pits and tanks.

Evercrete Vetrofluid protective anti-acid treatment inside a trench used for biomass storage.

Uses

- in negative pressure;
- on new or seasoned concrete;
- on newly cast concrete or with the formwork removed;
- on buried concrete;
- on foundation walls, decks, bed castings and ceilings.

Road building
- bridges
- underpasses
- dams
- tunnels
- curbs
- pavements
- cycling tracks
- decks
- viaducts

Industrial building
- water treatment plants
- tanks
- drinking water tanks
- pits
- wastewater containment tanks
- storage centres
- refuse recycling centres
- refuse sorting centres

Commercial building
- shopping centres
- outdoor car parks
- multi-storey car parks
- wellness centres
- sport arenas
- swimming pools
- foundation walls
- bed castings

Residential building
- ramps and garages
- concrete elements
- walls
- terraces
- decorative concrete elements

Agricultural building
- stables and barns
- cellars
- granaries
- animal feed depots
- pigsties
- biogas tanks
- horizontal silos

Instructions for use

Evercrete Vetrofluid® is easy to use. The product is ready to use and can be applied on horizontal, vertical and counter-thrust concrete, by spray application using low-pressure pumps, or with a roller or brush.

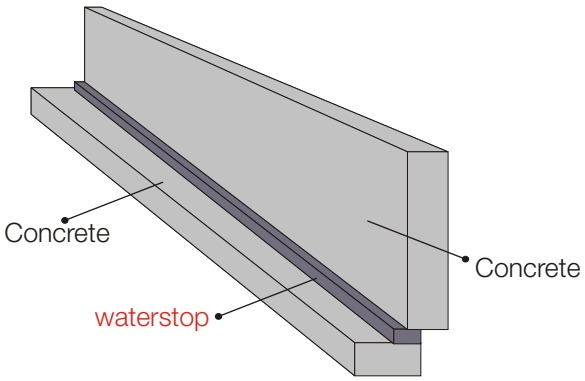
Application on concrete

- shake the product before use and prepare the ecobox,
- fill a low-pressure manual spraying pump or an electric pump with **Evercrete Vetrofluid®**;
- clean the surface; wet the surface a day before in the case of application on old concrete;
- apply the first coat, if it is a vertical surface, apply from bottom to top;
- apply the second coat.

Curing is complete in 36 days but after a few hours the surface is available for coatings or plasters that are not affected by humidity.

Application on underground artefacts

- repair the imperfections of the casting;
- seal and fill in the holes left by the formwork panels and the blades;
- in the resumed castings use a bentonite curb (waterstop);
- it is possible to bury the treated surfaces after 12 hours.



Yield

The yield of the product is approximately 2,5 m^2/kg if you intend to waterproof the concrete; for consolidating and protection 4,3 m^2/kg are sufficient.
If the product is used for protecting biogas plants the recommended yield is 1,7 m^2/kg for flooring , and 2,2 m^2/kg for the walls of the trenches, and 1,9 m^2/kg for those of the digesters.
The yield may vary depending on the conditions of the concrete that has to be treated. Two coats are necessary: The above mentioned yield is the total of both coats.

References

Evercrete Vetrofluid® is recommended for the protection and consolidation of roadbeds, underpasses, bridges, or artefacts affected by a heavy vehicle traffic and that, especially in the winter months are subject to freeze-thaw cycles and to the action of the de-icing salts.
Freeze-thaw cycles and de-icing salts cause accelerated and irremediable deterioration, this is why it is important to provide an appropriate treatment with **Evercrete Vetrofluid®**.

Overhead bridge, Treviso

Calvene bridge (Vicenza - Italy)

Bridge on Rudavoi stream, Cortina (BL) Italy

Referenze

Carugate underpass (Milano, Italy)

Fontaniva underpass (Padova, Italy)

Orsago underpass (Treviso, Italy)

Referenze

Mezzolombardo tunnels (Trento, Italy)

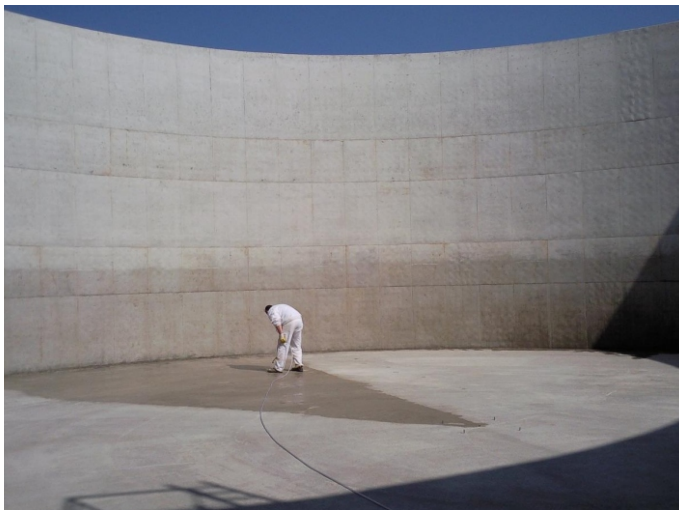
Anversa degli Abruzzi tunnel (Aquila, Italy)

Mestre bypass (Venice, Italy)

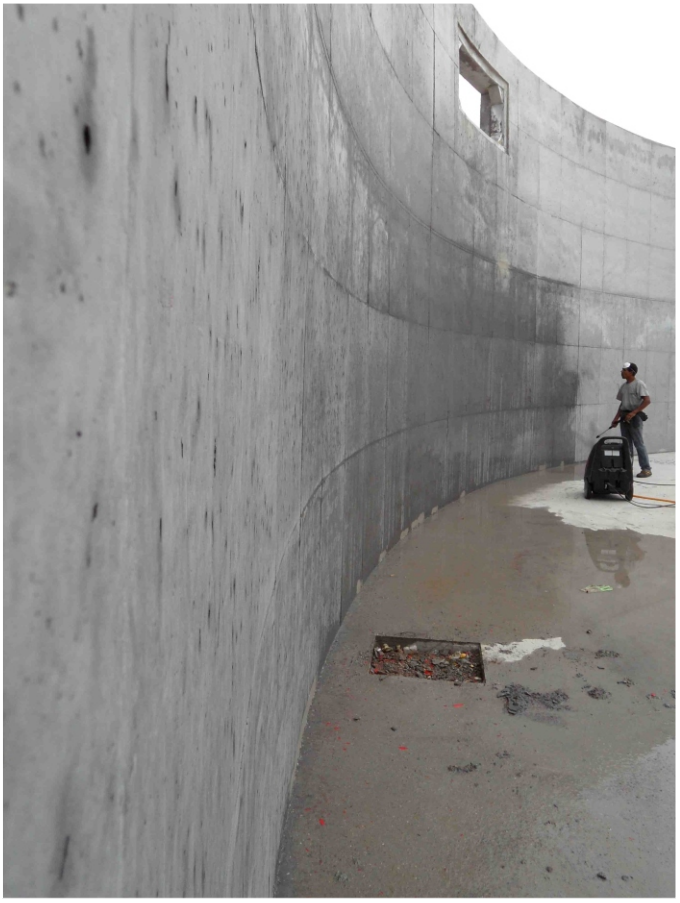
Referenze

Evercrete Vetrofluid® is recommended for the protection of concrete subject to acid aggression and is able to increase its durability in time.
Evercrete Vetrofluid® is successfully employed, with documented references in Italy and Europe, in the biogas and agricultural sectors to protect concrete which is constantly subject to deterioration and wear.

Biogas plant in Germany



Biogas plant in Padua (Italy)



Biogas plant in Carpaneto (Piacenza, Italy)

Referenze

Cavallaro farm, Stanghella (Padova, Italy)

Filippi windmill, (Vicenza, Italy)

Stable in Germany

Referenze

Evercrete Vetrofluid® is a permanent waterproofing system that preserves concrete from the erosive action of water for the entire lifespan of the artefact.
It is recommended for application on undergrounds artefacts, bed castings, ceilings, above ground walls and earth retaining walls.

Above ground walls in Castelnovo (Vicenza, Italy)

Walls in Schio (Vicenza, Italy)

Bed casting , Residenza Elena, Sarzana (La Spezia, Italy)

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